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Notice of Allowability	**Application No.** 10/679,981	**Applicant(s)** GOGUEN ET AL.	
	Examiner George C. Neurauter, Jr.	**Art Unit** 2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *20 August 2007*.
2. ☒ The allowed claim(s) is/are *1-17*.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

George C. Neurauter, Jr.
Primary Examiner

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Cindy Kaplan on 9 October 2007.

The application has been amended as follows:

The claims in their entirety read as follows:

1. A method for operating a forwarding device, said method comprising:

receiving a packet to be forwarded;

identifying a first forwarding table entry corresponding to a forwarding equivalence class of said packet;

determining whether a forwarding interface identified by said first forwarding table entry is protected by an active backup tunnel and adjacency information for said active backup tunnel has not yet been included in said entry;

when said forwarding interface is protected by an active backup tunnel and said adjacency information has not been included in said entry, performing a look-up in a second forwarding table to retrieve said adjacency information for said active backup tunnel; and

forwarding said packet in accordance with said adjacency information retrieved from said second forwarding table.

2. The method of claim 1 further comprising:

if said forwarding interface identified by said first forwarding table entry is either not currently protected by an active backup tunnel or said first forwarding table entry is currently protected by an active backup tunnel and said first forwarding table entry has already been rewritten with adjacency information for said backup tunnel, forwarding said packet in accordance with said adjacency information in said first forwarding table entry.

3. The method of claim 1 further comprising:

wherein determining comprises:

checking a global fix-up mode flag;

if said global fix-up mode is set, checking an entry-specific fix-up mode flag;

if said entry-specific fix-up mode flag is set, extracting a backup table identifier from said first forwarding table entry;

using said backup table identifier to identify a backup tunnel active bit in a backup tunnel active table, said backup tunnel active bit indicating that said forwarding interface identified by said first forwarding table entry is protected by said active backup tunnel.

4. The method of claim 3 further comprising:

upon activation of a selected backup tunnel to handle traffic transmitted via a selected interface, setting a corresponding bit in said backup tunnel active table corresponding to said selected backup tunnel and said selected interface.

5. A method of operating a forwarding device, said method comprising:

providing a forwarding table with entries corresponding to primary tunnels, each of said entries comprising:

adjacency information for packets matching the entry;

a backup tunnel table identifier pointing to adjacency information for a backup tunnel assigned to the entry; and

a pointer to a backup tunnel active flag for a backup tunnel protecting the corresponding primary tunnel;

providing a backup tunnel active table holding the backup tunnel active flags pointed to by the forwarding table entries; and providing a backup tunnel adjacency table with entries indexed by backup tunnel table identifier, each of said entries comprising adjacency information for packets taking a backup tunnel referenced by the entry's backup tunnel identifier.

6. The method of claim 5 further comprising:

receiving a packet to be forwarded;

forwarding said packet based on information in said forwarding table if an entry in said forwarding table matching said packet is current; and

forwarding said packet based on information in said backup tunnel adjacency table if said matching entry in said forwarding table has not yet been updated to reflect a backup tunnel activation.

7. A method of operating a forwarding device, said method comprising:

storing adjacency information for a primary tunnel in a first forwarding table;

establishing a backup tunnel protecting a segment of said primary tunnel;

storing adjacency information for said backup tunnel in a second forwarding table;

when said primary tunnel is operative, forwarding packets assigned to said primary tunnel based on a single look-up to said first forwarding table; and

upon activation of said backup tunnel in response to failure of said primary tunnel segment, forwarding packets assigned to said primary tunnel via said backup tunnel based on a look-up in said first forwarding table followed by a look-up in said second forwarding table;

wherein said first forwarding table and said second forwarding table are stored at the forwarding device.

8. The method of claim 7 further comprising:

after activation of said backup tunnel, rewriting adjacency information of said primary tunnel in said first forwarding table to reflect use of said backup tunnel; and thereafter

resuming forwarding packets assigned to said primary tunnel based on a single look-up to said first forwarding table.

9. A computer program product for operating a forwarding device, said computer program product comprising:

code that receives a packet to be forwarded;

code that identifies a first forwarding table entry corresponding to a forwarding equivalence class of said packet;

code that determines whether a forwarding interface identified by said first forwarding table entry is protected by an active backup tunnel and adjacency information for said active backup tunnel has not yet been included in said entry, and when said forwarding interface is protected by an active backup tunnel and said adjacency information has not been included in said entry,

performs a look-up in a second forwarding table to retrieve said adjacency information for said active backup tunnel and

forwards said packet in accordance with said adjacency information retrieved from said second forwarding table; and

a computer-readable medium that holds the codes.

10. A computer program product for operating a forwarding device, said computer program product comprising:

code that provides a forwarding table with entries corresponding to primary tunnels, each of said entries comprising:

adjacency information for packets matching the entry;

a backup tunnel table identifier pointing to adjacency information for a backup tunnel assigned to the entry; and

a pointer to a backup tunnel active flag for a backup tunnel protecting the corresponding primary tunnel;

code that provides a backup tunnel active table holding the backup tunnel active flags pointed to by the forwarding table entries;

code that provides a backup tunnel adjacency table with entries indexed by backup tunnel table identifier, each of said entries comprising adjacency information for packets taking a backup tunnel referenced by the entry's backup tunnel identifier; and

a computer-readable medium that holds the codes.

11. A computer program product for operating a forwarding device, said computer program product comprising:

code that stores adjacency information for a primary tunnel in a first forwarding table;

code that establishes a backup tunnel protecting a segment of said primary tunnel;

code that stores adjacency information for said backup tunnel in a second forwarding table;

code that, when said primary tunnel is operative, forwards packets assigned to said primary tunnel based on a single look-up to said first forwarding table;

code that, upon activation of said backup tunnel in response to failure of said primary tunnel segment, forwards packets assigned to said primary tunnel via said backup tunnel based on a look-up in said first forwarding table followed by a look-up in said second forwarding table; and

a computer-readable medium that holds the codes;

wherein said first forwarding table and said second forwarding table are stored at the forwarding device.

12. The computer program product of claim 11 further comprising:

code that, after activation of said backup tunnel, rewrites adjacency information of said primary tunnel in said first forwarding table to reflect use of said backup tunnel; and

code that resumes forwarding packets assigned to said primary tunnel based on a single look-up to said first forwarding table.

13. Apparatus for operating a forwarding device, said apparatus comprising:

a processor; and

a memory device that stores instructions to be executed by said processor, said instructions comprising:

code that receives a packet to be forwarded;

code that identifies a first forwarding table entry corresponding to a forwarding equivalence class of said packet;

code that determines whether a forwarding interface identified by said first forwarding table entry is protected by an active backup tunnel and adjacency information for said active backup tunnel has not yet been included in said entry, and when said forwarding interface is protected by an active backup tunnel and said adjacency information has not been included in said entry,

performs a look-up in a second forwarding table to retrieve said adjacency information for said active backup tunnel and

forwards said packet in accordance with said adjacency information retrieved from said second forwarding table.

14. Apparatus for operating a forwarding device, said apparatus comprising:

a processor; and

a memory device that stores instructions to be executed by said processor, said instructions comprising:

code that provides a forwarding table with entries corresponding to primary tunnels, each of said entries comprising:

adjacency information for packets matching the entry;

a backup tunnel table identifier pointing to adjacency information for a backup tunnel assigned to the entry; and

a pointer to a backup tunnel active flag for a backup tunnel protecting the corresponding primary tunnel;

code that provides a backup tunnel active table holding the backup tunnel active flags pointed to by the forwarding table entries; and

code that provides a backup tunnel adjacency table with entries indexed by backup tunnel table identifier, each of said entries comprising adjacency information for packets taking a backup tunnel referenced by the entry's backup tunnel identifier.

15. Apparatus for operating a forwarding device, said apparatus comprising:

a processor; and

a memory device that stores instructions to be executed by said processor, said instructions comprising:

code that stores adjacency information for a primary tunnel in a first forwarding table;

code that establishes a backup tunnel protecting a segment of said primary tunnel;

code that stores adjacency information for said backup tunnel in a second forwarding table;

code that, when said primary tunnel is operative, forwards packets assigned to said primary tunnel based on a single look-up to said first forwarding table; and code that, upon activation of said backup tunnel in response to failure of said primary tunnel segment, forwards packets assigned to said primary tunnel via said backup tunnel based on a look-up in said first forwarding table followed by a look-up in said second forwarding table;

wherein said first forwarding table and said second forwarding table are stored at the forwarding device.

16. The apparatus of claim 15 wherein said instructions further comprise:

code that, after activation of said backup tunnel, rewrites adjacency information of said primary tunnel in said first forwarding table to reflect use of said backup tunnel; and

code that resumes forwarding packets assigned to said primary tunnel based on a single look-up to said first forwarding table.

17. Apparatus for operating a forwarding device, said apparatus comprising:

means for receiving a packet to be forwarded;

means for identifying a first forwarding table entry corresponding to a forwarding equivalence class of said packet;

means for determining whether a forwarding interface identified by said first forwarding table entry is protected by an active backup tunnel and adjacency information for said active backup tunnel has not yet been included in said entry, and when said forwarding interface is protected by an active backup tunnel and said adjacency information has not been included in said entry,

performing a look-up in a second forwarding table to retrieve said adjacency information for said active backup tunnel and forwarding said packet in accordance with said adjacency information retrieved from said second forwarding table.

Allowable Subject Matter

Claims 1-17 are allowed in view of the Applicant's arguments, the cited prior art, and the prosecution history of the instant application, from which the reasons for allowance are clear.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C.

Neurauter, Jr. whose telephone number is 571-272-3918. The examiner can normally be reached on Monday-Friday 9am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley, can be reached on 571-272-3923. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

George C. Neurauter, Jr.
Primary Examiner